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Résumé : Dans cet article, nous étudions la façon dont la «value-relevance» des données comptables évolue en fonction du mois au cours duquel la valeur de marché a été observée. Pour cela nous estimons un modèle de résultat résiduel à partir de deux échantillons d'entreprises côtées en Allemagne et en France. Nous identifions de fortes divergences entre les deux échantillons. En France, les données comptables sont fortement reliées à la valeur de marché lors de la publication des résultats annuels en Février ou Mars; alors qu'en Allemagne, les données comptables ont une importance tout au long de l'année fiscale. Nous nommons ces deux effets, «forecast relevance» et «coincident relevance» respectivement. Cette divergence ayant disparu dès que les IFRS ont été adoptées en France, nos résultats montrent l'importance des rapports financiers intermédiaires étendus.

Mots clés : value relevance, resultat comptable, evaluation d'actions, methodologie

Abstract : In this paper, we extend comparative value relevance research by examining patterns in the value relevance of accounting numbers as a function of the month in which market values are observed. We stimate the residual income model on a sample of stock-exchange listed companies from Germany and France and find dramatically divergent patterns of fit. In France, accounting numbers have strong relevance for market valuation after publication of annual reports in February or March. In Germany, accounting numbers have stronger relevance during the fiscal year. We term the two effects forecast and coincident relevance, respectively. We argue that the divergence in patterns of fit may be a result of limited interim reporting in France before adoption of IFRS.

Key words: value relevance, accounting earnings, equity valuation, methodology

1. Introduction

Value relevance research attempts to explain the relationship between accounting numbers and stock valuation. A longstanding strain of research shows that book values and earnings are correlated with market values (Easton et al., 1992), and that investors react to corporate disclosures (Ball & Brown, 1968). These results are interpreted as proof of the ability of accounting numbers to capture economic information which affects market value. The value relevance relationship is also used in comparative international studies of accounting information quality. Such studies, referred to as association studies by Holthausen and Watts (2001), use accounting-based valuation models and econometric procedures and compare parameter estimates across countries. One issue that has received little attention so far is the date on which market values are observed. Typically, market values are observed after the publication of annual financial statements, in February or March. This approach stems from the researchers' understanding of value relevance relationship as the effect of published information on stock valuation. However, value relevant information which is contained in accounting data may have already been disseminated to the market by other sources, which could lead to strong correlations between yet unpublished accounting numbers and stock

valuation before publication. We provide evidence that parameter estimates of value relevance regressions can vary significantly depending on the month in which market value is observed. Moreover, monthly patterns in parameter values vary between countries. We suggest that divergence of patterns can be a result of differences in access to accounting information during the fiscal year (interim reporting).

In this paper we focus on the residual income valuation model of Ohlson (1995) and examine variations in the explanatory power of the model as a function of the month in which market value is observed. The model is estimated on a sample of annual financial report data for French and German stock exchange listed companies over a period from 1989 to 2008. These two countries were selected for the sample because they experienced strong economic integration during the sample period, which limits the number of material variables that affect model parameters. The two economies are highly correlated in terms of gross domestic product, interest rates and cost of equity capital. Since both countries are founding members of the European Monetary Union, their currencies were closely aligned, first by the Exchange Rate Mechanism, and then by pegging to the Euro and finally substituting the Euro for the franc and the mark. Thus, variations in exchange rates have little impact on investors' decisions during our sample period. Similarly, interest rates became harmonized after adoption of the euro in 1999, and exhibited strong nominal convergence before that time. The stock markets themselves are of a comparable size and liquidity, access to them is subject to EU freedom of capital transactions regulation. As far as accounting standards are concerned France and Germany have strong traditions of macro-uniform, conservative accounting. While we discuss differences between their accounting standards in section 3, we argue that these differences are relatively small.

In spite of economic and institutional proximity of France and Germany, we find that the two samples exhibit divergent patterns of fit. In the French sample, the accounting valuation model has limited explanatory power for stock valuation up until the publication of annual accounts. However, once the accounts are published, fit improves considerably. This result would support the traditional approach to observing market value after the publication of annual accounts. In contrast, in the German sample the model explains best market values before the publication of annual accounts. Fit deteriorates significantly after the end of the fiscal year. As a result, if market values are observed in March, Germany would exhibit lower value relevance than France. We find that this conclusion would be incorrect for two reasons. First, results for Germany show that explained variability is three times higher when October market values are used as the dependent variable than when March market values are used. In France, R-squared for October market values is five times lower than for March values. Second, when we limit each country sample to companies reporting according to International Financial Reporting Standards (IFRS) the two countries show similar patterns – the pattern in France resembles that in previously observed in Germany – although for the IFRS sample R-squared in France is significantly lower than in Germany.

Divergence of patterns of fit can be explained by availability of accounting information during the fiscal year. Detailed interim reports allow the market to assess and price corporate performance during the fiscal year before the publication of annual accounts. Since IFRS were adopted, companies in both France and Germany have had to comply with minimum disclosure requirements of IAS 34. Until then German companies were required to disclose

extensive financial information every quarter, while their French counterparts disclosed only revenue numbers. Thus, investors in Germany were able to assess and price the benefits from holding corporate stock accurately before annual accounts were disclosed. In presence of detailed interim reporting, disclosure of past performance in annual accounts does not convey new information, and does not result in market value changes. At the time of report publication for the last year, investors already concern themselves with performance in the new fiscal year. In France, investors received little information during the fiscal year and could update their assessment only after the publication of annual accounts. For that reason annual accounting numbers are highly correlated with market values in March. The fact that the pattern shifted after interim disclosure was enhanced under IFRS supports this argument.

Our findings have implications for comparative accounting research and financial reporting regulation. Regarding international comparative research, we show that the choice of month when stock prices are observed can have a significant impact on results. In countries with detailed interim reporting it is best to observe prices at the end of the fiscal year, while in countries with limited reporting, one needs to observe prices after annual accounts publication. The practice of observing market values three months after fiscal-year-end leads to underestimation of value relevance in countries with detailed interim reporting. Regarding financial reporting regulation, our results support introduction of detailed interim reporting. The change in correlation patterns in France clearly shows that investors make use of enhanced interim reporting provided under IAS 34.

2. Coincident and forecast relevance of accounting numbers

This study is founded on the belief that accounting numbers provide a valuable input into stock pricing (Holthausen & Watts, 2001), which leads us to employ the residual income valuation model of Ohlson (1995). As we discuss in some detail below, the residual income valuation model has the advantage over alternative model in providing a closed form which explicitly links market value to current accounting numbers. In contrast to extant research, we do not assume that the relevance of accounting numbers stems from their direct impact on market value upon publicaiton of financial reports. Instead, we consider the effect of accounting information availability on market valuation by observing the market value both before and after the end of the fiscal year. We adopt the regression coefficient within groups (within R-squared) as the measure of value relevance. To facilitate discussion we distinguish between value relevance before and after fiscal-year-end. We term value relevance before fiscal-year-end as coincident relevance, while value relevance for months after year-end we term forecast relevance. These terms are described below.

According to financial economics theory investors make trading decisions on the basis of their assessment of future benefits from holding corporate stock. This assessment requires forecasting benefits for both the present fiscal year, and the subsequent years. During the fiscal year investors can obtain information that affects their assessment of current performance from corporate disclosures, interim reports, market research and news media. These forecasts of current performance are eventually verified at the time of annual accounts publication. It follows from this sequence of events and from the efficient market theory that once the annual accounts are published, the performance information contained in them should be immediately priced by the market (albeit with a short post-announcement drift).

Market reaction to annual account publication depends on two factors. First, market reaction will be stronger the larger the difference between market assessment of benefits realized in the past fiscal year. We term this effect *coincident value relevance of accounting numbers*, because it refers to assessment of current financial performance. Second, updated assessment of current financial performance and financial situation of the company may have an impact of forecasts of future benefits to investors. We term the second effect *forecast relevance of accounting numbers*, because it refers to the impact of accounting information on forecasts of future performance.

We introduce the distinction between coincident and forecast relevance to discuss variations in the explanatory power of the residual earnings model depending on the month in which market value is observed. Accounting numbers can be expected to have high coincident value relevance before annual accounts are published, because it is during this period that investors' assessment of current performance changes. If market value is observed before fiscal-year-end, neither current accounting numbers, nor all relevant economic factors are known to the investors, because the year is still not finished. However, as the end of the year comes closer, an increasing amount of value relevant economic information becomes known to investors – for example market situation, major events in the sector, and major events at the company. Investors may also receive interim financial reports from the company. Some of this information is also being captured by the accounting systems at the company, though the annual accounts have not been created or published yet.

After the year is finished, but before publication of annual accounts, market value is already affected by coincident relevance of next year's accounting numbers. However, past year's accounting numbers are still relevant to the extent that they affect forecasts of the following years' performance – an effect which we refer to as forecast relevance. As the new fiscal year continues, any changes in market value will be decreasingly linked to reassessment of past performance. Eventually, when annual accounts are published, past performance will become public information. Market value will then adjust for any differences between previous estimates and the actual financial performance over the past year. Subsequent changes in market value should not be expected to be caused by information about past performance.

The discussion of whether accounting numbers can be expected to have higher coincident or forecast relevance power is not present in the value-relevance literature. In fact, most empirical studies consider either stock prices close to a disclosure date or end-of-year stock prices. We compare the two effects without making *a priori* assumptions. On the one hand, investors may be able to estimate current performance accurately during the fiscal year. We would then expect increasing coincident relevance towards the end of the fiscal year, when current performance is correctly estimated and at the same time fully captured by accounting numbers which are yet to be disclosed. On the other hand, if investors are not able to make accurate estimates, they will have to wait until annual accounts are published to update their valuations. We would then expect low coincident relevance, and high forecast relevance close to publication of annual accounts, but low coincident relevance before that time.

To measure the coincident and forecast relevance of accounting numbers, we use the residual income valuation model (RIV) as formulated by Ohlson (1995). The model consists of a basic valuation formula and linear information dynamics. The former is derived from the simple

dividend discounting model and the assumption of clean surplus accounting.[1] These two assumptions allow market value of equity (MV_t) to be expressed in terms of book value of equity (BV_t) and discounted stream of future residual incomes (RI_t):[2]

$$MV_t = BV_t + \sum_{k=1}^{\infty} E_t(RI_{t+k})/(1+r_e)^k \quad (1)$$

Here, $E_t()$ denotes the expectation operator conditional on information at time t, and r_e is the opportunity cost of equity capital. Current residual income (or abnormal earnings) is defined as reported earnings (I_t) minus required return on initial book value of equity ($RI_t = I_t - r_e BV_{t-1}$). To apply the formula (1) to stock valuation the expectations of future residual income need to be formed from market predictions or need to be modeled directly. Ohlson's contribution to the existing valuation framework was the introduction of linear information dynamics (LIM) which allow the modeling of expected values:

$$\begin{aligned} RI_t &= \omega RI_t + v_{t-1} + \varepsilon_{1t} \\ v_t &= \gamma v_{t-1} + \varepsilon_{2t} \end{aligned} \quad (2)$$

The autoregressive process of residual income RI_t (interpreted as economic surplus) as defined in formula (2) is transitory, and mean-reverting ($0<\omega<1$). On top of that, residual earnings depend on non-accounting information v_{t-1} from the previous period. Non-accounting information (referred to as "other information") is also mean reverting ($0<\gamma<1$). White noise disturbances are denoted ε_{1t}, ε_{2t} respectively. When the LIM structure is imposed on residual income, the valuation formula (1) reduces to the following reduced form:

$$MV_t = BV_t + \frac{\omega}{1+r_e-\omega} RI_t + \frac{1+r_e}{(1+r_e-\omega)(1+r_e-\gamma)} v_t \quad (3)$$

The reduced form has the important advantage over other valuation models in expressing current market value of equity as the function of contemporaneous accounting figures and non-accounting information, as opposed to forecasts. Unlike forecasts, accounting information is directly observed quarterly or yearly with some publication delay. Other information can either be proxied as the analyst forecast error or as the residual error from historical unconditional regression (Barth, et al., 2005; Dechow, et al., 1999).

3. Reporting regimes in Germany and France

Germany and France are closely related and share a number of economic and institutional characteristics, not least because they are both longstanding members of the European Union. Since the adoption of IFRS in the European Union financial reporting by stock listed companies has been harmonized. In comparative accounting research the national accounting models of the two countries are classified as representatives of the legal compliance or macro-uniform model (Gernon & Meek 1997). This model is characteristic for countries with

[1] According to these assumptions the discounted future cash flow of net dividends expected at time ($E_t(D)_{t+1}$) determines the market value of equity: $MV_t = \sum E_t(D_{t+k})/(1+r_e)^k$ and the book value of equity increases by retained earnings (net earnings I_t minus dividends): $BV_t = BV_{t-1} + (I_t - D_t)$.

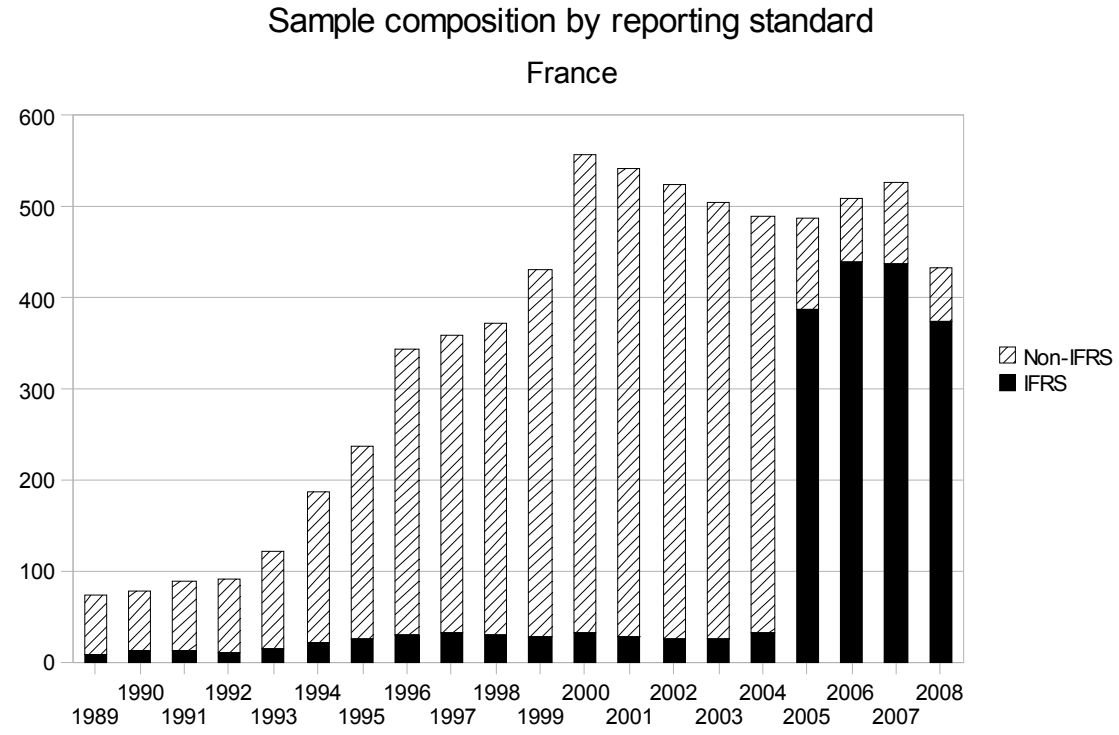
[2] The validity of formula (1) relies also on the common regularity condition i.e. the convergence of an infinite sum of the discounted abnormal earnings series.

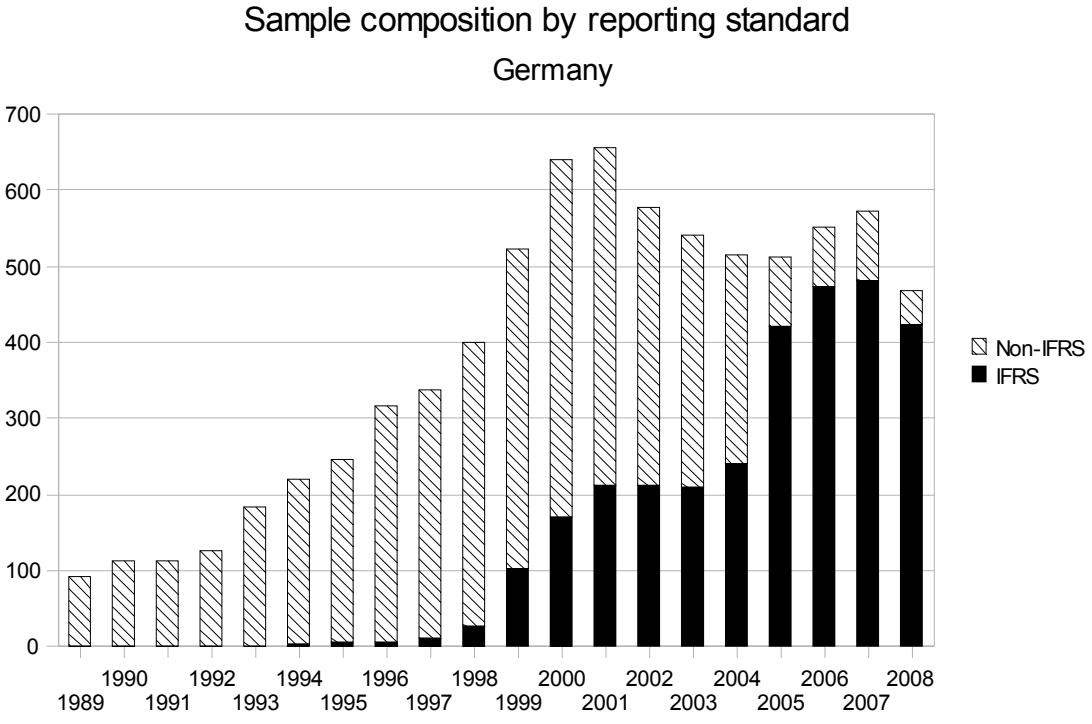
concentrated corporate ownership and limited demand for external reporting. Accounting practice is standardized by rule-based accounting law and compliance with tax regulation. Thus, national accounting traditions in both France and Germany contrast with the faithful representation model present in the IFRS. Moreover, before 2005 the two countries adopted different interim disclosure regulation. German companies were required to publish detailed quarterly and semi-annual statements: balance sheet, income statement, statement of changes in equity and cash flow statement and notes were all available. In contrast, French companies were required to report only their revenues quarterly, and selected income statement information semi-annually. It can be argued that the lack of detailed interim reporting in France means that investors need to rely on other sources of information throughout the year to assess the performance of their portfolio companies. Otherwise, they need to wait until annual accounts are published to make their trading decisions. In line with the preceding section, we hypothesize that in Germany one can observe high coincident relevance, while in France - high forecast relevance of accounting numbers.

Interim reporting was harmonized when French and German listed companies became subject to IAS 34, which set minimum disclosure standards for mandatory interim reports, and when these were not mandatory encouraged companies to adopt the standard at least for semi-annual reports. For most companies in France this requirement became binding after mandatory IFRS adoption for fiscal year 2005. However, in Germany many companies adopted IFRS voluntarily as early as 1999, which is the year when IAS 34 came to force. Within our sample a fifth of German companies reported under IFRS in 1999, half in 2004 and almost 90% in 2005 (Figure 1). In contrast, this is true for only 6% of French companies up until 2005. In 1999, the French regulator COB approved a recommendation similar to IAS 34, but weaker.[3] The recommendation suggested publication of semi-annual statements with a four month delay and did not make interim reporting mandatory.

[3] Commission des Operations de Bourse recommendation 99-01. The COB has been superseded by l'Autorite des Marches Financiers in 2003.

Figure 1. Number of companies reporting under IFRS and their share in the sample – for France (top panel) and Germany (bottom panel)





Before the adoption of IFRS, stock listed companies in both Germany and France followed conservative national accounting standards, with strong emphasis on compliance with the law, rather than representational fairness. Local accounting systems are highly developed, which results in a large number of detailed provisions divergent from International Accounting Standards (Ding, et al., 2006). Both systems put less weight on shareholders' information needs, and more weight on the needs of creditors and tax authorities. In France, accounting is characterized by the use of a standard chart of accounts (Delvaille, et al., 2005). German accountants, on the other hand, prepare the same accounts for reporting and for tax purposes. Liberal use of reserves is permitted in order to smooth earnings so that dividend payout ratios can be kept at a stable level (Goldberg & Godwin, 2002).

4. Research design

The main focus of our study is to examine variations in the coincident and forecast relevance of accounting numbers as a function of the month in which market value is observed. To this end we perform separate estimations of the residual income model on average market value of equity measured in each of six months in the last part of a fiscal year from July to December (m=7,...,12), and then in each month of the first six months of a new fiscal year from January to June (m=1,...,6)[4]. We interpret standard measures of goodness of fit (R-squared) and standard errors of parameters in these regressions as, respectively, overall and univariate coincident and forecast relevance (as discussed above).

We use a country panel regression framework, which focuses on evolution of market values in time, while allowing us to benefit from cross-sectional variability to gain estimation efficiency. In doing so, we share Kothari & Shanken (2003) viewpoint that the Ohlson model is a time series model, and it should be applied to the explaining time-series (not cross-sectional) variation in market prices. Since our sample is limited to the last 20 years of accounting data we cannot effectively estimate value-relevance regressions for single companies, so we use the panel regression framework. Note that parameters of model (3) standing at abnormal earnings and non-accounting information can vary between individual companies because of firm-specific autoregressive coefficients and risk-adjusted discount rates. When designing panel research one needs to decide which parameters should be allowed to vary. We estimate discount rates individually for each stock when calculating residual income. However, in model (3) we treat all parameters as homogeneous. As a result, coefficient estimates from panel regressions are average values of individual (firm) coefficients, and their standard errors measure the level of homogeneity across the sample. While this approach does not allow for full variation of parameters, it is efficient, and it is more robust to misspecification problems than cross-sectional regressions. Ignoring firm specific effects (OLS) or applying Fama-MacBeth procedure (a common practice in finance research) leads to downward bias in standard errors, as discussed by Petersen (2009).

The general empirical model has the following form:

$$\begin{aligned} &MV_{i,t_m} = \alpha_0 + \alpha_i + \beta_1 BV_{it} + \beta_2 RI_{it} + u_{it}, \\ &\text{with } t_m = t \quad \text{for } m = 7,8,9,10,11,12, \\ &\text{and } t_m = (t+1) \quad \text{for } m = 1,2,3,4,5,6. \end{aligned} \tag{4}$$

[4] The sample is limited to companies that report on 31st of December every year.

For each company ($i=1,...,N$) the parameters α_i are constant (fixed or random) effects, and u_{it} are weakly stationary idiosyncratic disturbances with $E(u_{it})=0$, possibly heteroskedastic ($E(u^2_{it})\neq\sigma^2$), and correlated within the firms ($E(u_{it}u_{it-1})\neq\sigma^2$). Separate regressions are estimated for each month of the year. Because we hold regression parameters homogeneous for each country sample, we expect to see heteroskedasticity. From formula (3) we have also omitted the non-accounting information variable (v_t). Its dynamics is mean-reverting which could introduce problems with residual autocorrelation in equation (4). To solve both problems we adopt two alternative solutions. First, we use one-way fixed effects estimator of the autoregressive error component model (AEC) in unequally spaced panels, following Baltagi & Wu (1999). Second, we perform fixed effects panel regression (one-way error component model) with Newey-West heteroskedasticity and autocorrelation corrected (HAC) standard errors (Wooldridge, 2007).

We find the AEC procedure preferable. This empirical specification allows us to explicitly include and estimate autocorrelation structure of non-accounting information variable (v_t). It removes the problem of choosing a proxy that would be appropriate for the whole sample. For example, in American literature (Dechow et al. 1999), prediction errors of market consensus earnings forecasts are easily obtained from I/B/E/S files. This is fairly reliable for US companies, but observations for German and French companies are few. Moreover, extant research using expert forecasts (Barth et al., 2005) shows that they add little to the explanatory power of the model. Hence, our solution is to use a model with autoregressive residuals as it was suggested in case of testing market inefficiency by Aboody, et al. (2002). This model takes the following form:

$$\begin{aligned} MV_{i,t_m} &= \alpha_0 + \alpha_i + \beta_1 BV_{it} + \beta_2 RI_{it} + \varepsilon_{it}, \\ \varepsilon_{it} &= \rho\varepsilon_{it-1} + \eta_{it}, \end{aligned} \tag{5}$$

Here ε_{it} are weakly stationary, homoskedastic idiosyncratic disturbances with $E(\varepsilon_{it})=0$, homogenously correlated within the firms, and not correlated cross-sectionally.

5. Data

The sample contains observations of annual financial statement figures for French and German stock-exchange listed companies from 1989 to 2008 joined with monthly observations of average market value of equity for the last six months of the fiscal year and the first six months of the following year.[5] We use average monthly market values, rather than market values observed at a certain day of the month, to reduce noise from daily trading, especially where trading is thin. The final data set contains 5,354 firm-year observations for France and 6,062 firm-year observations for Germany. All accounting data is obtained from Compustat Global Fundamentals Annual database supplied by Wharton Research Data Services. The daily quotations of stocks (prices and the number of ordinary shares) listed at the Paris Stock Exchange (Euronext Paris) in France and Deutsche Boerse in Germany from January 1989 till December 2008 come from Compustat Global Security Daily data set. We adjust these figures in the following way:

1. we use only ordinary shares and disregard preferred shares,

[5] For ease of estimation we limit the sample to companies which use the calendar year as their fiscal year.

2. we calculate average total market values as the product of the average monthly close price per share and the number of ordinary shares outstanding, repeating the calculation for each month (if there were fewer than 10 daily quotes available, we dropped that month from the sample),
3. we exclude companies quoted for less than 36 months, belonging to the financial sector, or closing their accounts at a different date than December 31st.

We calculate risk-adjusted cost of equity as the sum of the risk-free rate and equity risk premium. As the proxy for the first component we employ short-term money market interest rates separately for each country (although they are almost indistinguishable). The equity risk premium was measured as the country risk premium (estimated from Standard & Poors' ratings, following Damodaran's methodology) multiplied by the beta coefficient estimated for each stock in the one-factor market model of W. Sharpe. Value-weighted price indexes of all stocks were treated as country market proxies instead of usual stock indexes figures.

Table 1. Descriptive statistics

	N	Mean	SD.	Min	Max
France					
MV	5357	1 325.6	6 071.5	0.4	148 773.9
BV	5351	776.6	3 427.5	0.0	123 999.0
RI	4335	-2.1	719.9	-26 666.1	17 324.4
France: IFRS reporting companies only					
MV	1544	2 156.4	8 011.9	1.3	126 696.5
BV	1541	1 211.3	4 033.7	0.0	53 689.0
RI	1394	35.9	437.2	-6 564.7	4 347.2
Germany					
MV	6063	1 347.6	6 177.3	0.3	178 901.2
BV	6058	744.9	3 374.7	0.0	60 994.0
RI	5184	11.3	523.9	-29 473.0	6 945.3
Germany: IFRS reporting companies only					
MV	2516	1 461.1	5 566.2	1.0	81 740.1
BV	2512	838.5	3 419.7	0.0	49 374.0
RI	2245	32.4	311.8	-3 947.8	3 440.3

Variable codes: MV stands for average market value in December, BV stands for book value of shareholders equity, RI stands for residual income.

Table 1 supports our assumption that the samples of French and German stock-listed companies are to a large extent homogeneous. They do not differ significantly in terms of average annual market value or book value. While a relatively larger proportion of companies file IFRS reports in Germany (40%) than in France (30%), IFRS adopters share similar characteristics. Both in France and Germany IFRS adopters are more profitable. They report higher average residual income, especially in Germany, where the difference is threefold. Higher profitability of IFRS reporting companies may result from limited time span in which IFRS reports are present (since 1999 in Germany and since 2005 in France). When it comes to size, French IFRS adopters tend to be larger, while in Germany the difference is insignificant.

6. Empirical results

In this section we provide panel estimation results for French and German samples to test for coincident relevance (six last months of the same fiscal year for which accounting numbers are available) and forecast relevance (six first months of the next fiscal year) of model (5) with fixed effects and autoregressive error component (AEC). We find that the French and German samples produce divergent patterns of model fit (Table 2). Results are summarized in Figure 2, which shows how within-R-squared coefficients vary for each regression by month of market value observation and accounting standards in France and Germany. Figure 2 also shows how patterns of fit change when only IFRS reports are included in the sample. Below we start by describing results of estimation on the whole sample, and then discuss the IFRS sub-samples.

In France, accounting numbers have little coincident relevance; residual income has a negative impact on market value until the end of a fiscal year. Afterwards, market value of equity is positively correlated with residual income, as theory predicts. The precision of estimation distinctly increases in February and March of every year, which coincides with annual account publication. It can be readily seen (see Figure 2) that R-squared sharply increases for regressions of accounting numbers on market values in the months at the beginning of the year, with the maximum of 55% in March. Thus, we find evidence of high forecast relevance of accounting earnings in France.

The German sample presents a mirror image of high coincident relevance but low forecast relevance. Accounting numbers explain the largest part of market value variance when market value is observed between July and December, with maximum of within-R-squared (34%) in October, which indicates high coincident relevance. After fiscal-year-end R-squared drops suddenly as early as January and then model fit steadily deteriorates. The residual income coefficient is positive and significant in all regressions, but it decreases from 1.59 in July to 0.58 in March and then becomes insignificant. Book value coefficients are statistically significant and close to unity for every month, whereas in the French sample they were below unity.

In search for possible explanations of the divergence in coincident/forecast relevance of accounting numbers we split the sample into two subgroups: reports published in accordance with IFRS and reports published under other standards, denoted as non-IFRS (see Appendix 1 & 2). When we restrict samples to IFRS-based reports only, the model shows evidence of high coincident relevance (second half of the year) and low forecast relevance (first half of the new year) in both countries. This pattern is similar to the full German sample, but the maximum correlation is achieved in December. The French sample remains distinct in that model fit is significantly lower than in the German IFRS sample, an effect for which we can offer no explanation at this point. It is apparent, however, that the previous pattern in the French full sample arises from low coincident and high forecast relevance of non-IFRS accounting numbers (see Figure 2).

Despite the differences between samples, results in both country samples confirm the selection of estimation procedures. Firstly, statistical tests show (tests for heterogeneity, Hausman test of random effects) that the fixed effects estimator is preferred, which confirms

our theoretical reasoning that lead to this choice.[6] Secondly, significant autocorrelation in the error term is in fact present (see Baltagi&Wu (1999) LBI test statistics), which supports the selection of autoregressive error component procedure. In Appendix 1 we provide results of fixed effects estimation with heteroskedasticity and autocorrelation corrected standard errors (HAC). Comparison of results proves that there are considerable gains from using a more precise AEC estimator rather than fixed effects HAC standard errors.

Figure 2. Comparison of within R2 by country and reporting standard

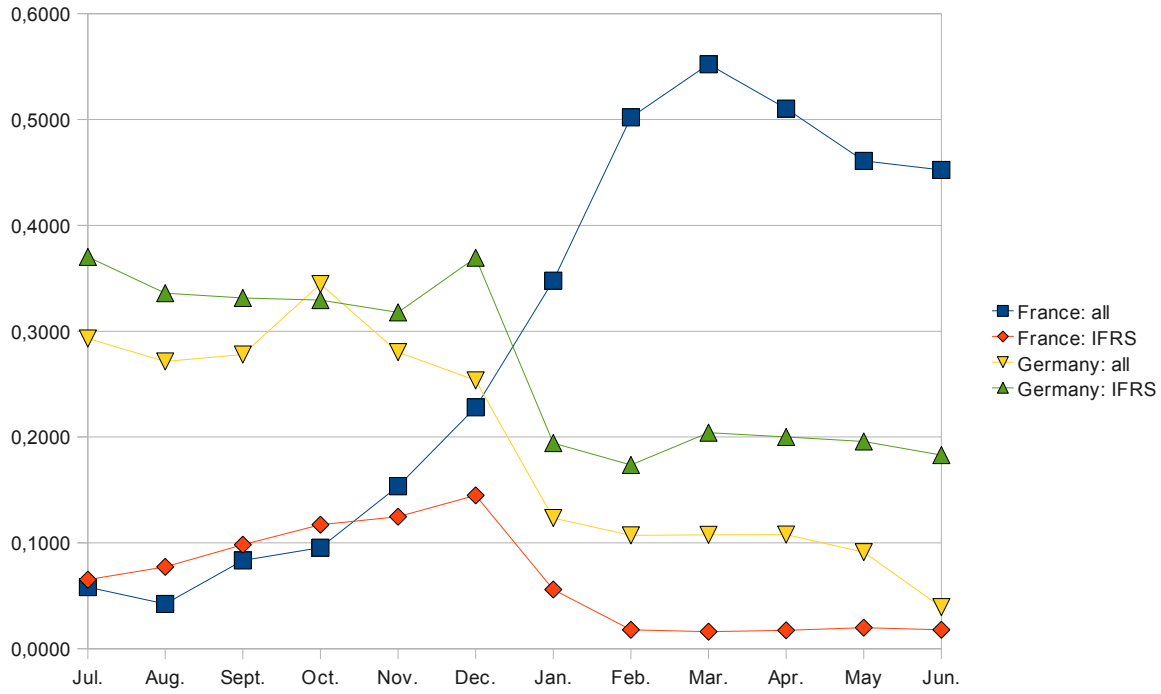


Figure shows correlations of the residual income model and market values observed in the last six months of a fiscal year (Jul.-Dec.), and first six months of the following fiscal year (Jan.-Jun.). Note: correlation is measured by within R^2 obtained from model with autoregressive error component, see Table 2 (within R^2 is measured as squared correlation of individually demeaned variables, that is within observations for each company; overall R^2 is higher, because it takes company-specific intercept into account).

[6] Fixed effects estimator is mainly focused to explain the variation within a group of observations (for each firm in our case), while random effect component is a weighted average of OLS and fixed effects. The fixed effects estimator also allows for individual effects to be correlated with explanatory variables.

Table 2. Estimation results of model (5) with autoregressive error component (AEC)

	Before fiscal-year-end						After fiscal-year-end					
	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
France: full sample												
RI	-0,86	-0,68	-0,54	-0,50	-0,39	-0,06	0,31	0,59	0,56	0,26	0,20	0,27
t(RI)	-10,15	-8,26	-6,39	-6,31	-5,19	-0,79	6,06	11,44	9,59	5,10	3,74	4,50
BV	0,32	0,26	0,40	0,40	0,47	0,51	0,41	0,53	0,73	0,60	0,58	0,65
t(BV)	13,23	11,32	16,67	17,77	22,28	25,58	25,83	33,33	40,31	38,55	35,59	35,14
N	3 606	3 584	3 614	3 621	3 621	3 663	3 179	3 169	3 167	3 149	3 148	3 154
R2_within	0,06	0,04	0,08	0,10	0,15	0,23	0,35	0,50	0,55	0,51	0,46	0,45
rho(u)	0,45	0,49	0,37	0,46	0,51	0,58	0,77	0,74	0,63	0,74	0,72	0,63
LBI	1,63	1,59	1,74	1,56	1,44	1,33	1,16	1,06	1,11	0,96	0,96	1,04
France: IFRS reports only												
RI	1,35	1,41	1,58	2,05	2,20	2,63	0,15	0,05	0,30	0,15	-0,31	-0,34
t(RI)	4,82	6,17	6,38	6,86	7,51	8,53	0,90	0,26	1,41	0,79	-1,57	-1,60
BV	0,09	0,01	0,07	0,15	0,12	0,09	0,16	0,12	0,07	0,09	0,15	0,15
t(BV)	1,69	0,13	1,45	2,49	2,10	1,52	4,70	2,73	1,63	2,23	3,57	3,39
N	999	1 000	996	1 002	998	1 001	963	957	951	951	948	948
R2_within	0,07	0,08	0,10	0,12	0,12	0,14	0,06	0,02	0,02	0,02	0,02	0,02
rho(u)	0,16	0,33	0,22	0,04	0,00	0,06	0,41	0,43	0,47	0,53	0,52	0,49
LBI	2,08	1,83	1,96	2,26	2,34	2,30	1,79	1,57	1,45	1,39	1,43	1,50

Table reports coefficient estimates and model fit statistics for average market values observed in the months around fiscal-year-end. Variable codes: RI stands for residual income, BV stands for book value of shareholders equity, rho(u) is the AR(1) coefficient of the residual, LBI stands for Baltagi and Wu (1999) modified Durbin-Watson statistic. Intercept is omitted from the tabulation.

Table 2. (cont.)

	Before fiscal-year-end						After fiscal-year-end					
	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
Germany: full sample												
RI	1,59	1,23	1,18	1,07	0,77	0,61	0,35	0,46	0,58	0,15	-0,07	0,02
t(RI)	23,51	21,10	21,27	17,43	10,44	6,79	3,54	3,53	4,10	1,38	-0,74	0,19
BV	0,92	0,80	0,78	1,13	1,17	1,23	0,90	0,98	1,01	0,98	0,86	0,60
t(BV)	24,23	23,88	24,46	34,68	32,89	32,34	19,72	18,11	18,03	18,87	17,73	11,15
N	4 409	4 385	4 388	4 369	4 384	4 380	3 866	3 842	3 866	3 841	3 856	3 860
R2_within	0,29	0,27	0,28	0,34	0,28	0,25	0,12	0,11	0,11	0,11	0,09	0,04
rho(u)	0,64	0,67	0,67	0,59	0,51	0,39	0,44	0,33	0,28	0,44	0,52	0,60
LBI	0,94	1,01	1,06	1,19	1,32	1,46	1,35	1,53	1,59	1,35	1,26	1,17
Germany: IFRS reports only												
RI	0,81	0,77	0,76	1,63	1,62	1,90	0,59	0,75	1,02	1,05	1,11	1,03
t(RI)	5,91	5,69	5,11	7,49	7,40	9,84	3,69	4,53	6,03	6,16	6,63	6,01
BV	1,68	1,58	1,72	2,28	2,24	2,02	0,99	0,90	0,95	0,95	0,90	0,89
t(BV)	24,10	22,18	22,24	20,86	20,25	21,78	13,58	11,96	12,49	12,18	11,58	11,38
N	1 773	1 774	1 771	1 771	1 773	1 771	1 610	1 609	1 609	1 610	1 607	1 609
R2_within	0,37	0,34	0,33	0,33	0,32	0,37	0,19	0,17	0,20	0,20	0,20	0,18
rho(u)	0,50	0,56	0,54	0,49	0,49	0,43	0,55	0,54	0,52	0,57	0,60	0,56
LBI	1,62	1,53	1,53	1,73	1,71	1,73	1,56	1,54	1,56	1,52	1,51	1,62

Table reports coefficient estimates and model fit statistics for average market values observed in the months around fiscal-year-end. Variable codes: RI stands for residual income, BV stands for book value of shareholders equity, rho(u) is the AR(1) coefficient of the residual, LBI stands for Baltagi and Wu (1999) modified Durbin-Watson statistic. Intercept is omitted from the tabulation.

7. Discussion

Results presented in the previous section show that France and Germany exhibit divergent patterns in model fit, when we estimate a separate model for market values observed in each of 12 months around fiscal-year-end. Moreover, we find that the pattern in France shifts after adoption of IFRS, and becomes more similar in shape to the one in Germany (although fit is consistently lower). These results are interesting for two reasons. First, they raise the question of why the patterns were different in France and Germany before adoption of IFRS. Second, they call for an explanation of why the patterns shifted in France, but not in Germany after IFRS were adopted.

We argue that both the initial difference in patterns and the convergence after IFRS adoption can be explained by one major factor: interim reporting regulation and practice. As we pointed out earlier, German listed companies were required to provide more extensive interim reports than their French counterparts before the adoption of IFRS. Under IFRS (IAS 34) companies in both countries are required to publish similar minimum set of semi-annual statements, and many French companies choose to publish detailed quarterly statements as well. When only limited reports were available in France, investors had little information about current performance of their portfolio companies. For that reason annual accounts provided a relatively more significant information input to the market at the time of their publication. Once interim reporting was enhanced, investors were able to assess performance more accurately by using quarterly and semi-annual statements even before the announcement of annual accounts.

Our findings are supported by a substantial literature which shows that publication of interim reports conveys information to the market. Event studies in the French market identify abnormal returns around quarterly report publication before the adoption of IFRS: Elleuch (2003) finds this to be true for France in her 1996-1998 sample as do Gajewski and Quere (2001) in their 1994-1996 sample. However, the limited content of quarterly reports seems to strengthen market reaction to annual reports relative to USA (Gajewski & Quere, 2001). Abnormal returns around interim statement publications have also been observed in the UK (Opong, 1995) and the USA, where a number of papers on this subject were published dating as far back as 1960s (Bamber, 1987; May, 1971; Rappaport, 1966).

Event studies literature proves that interim reports provide useful information for assessing and predicting corporate performance. Abnormal returns around interim report publication dates are a reflection of new information flowing into the market: investors updating their valuation of company stock. If a company publishes detailed quarterly statements, there is relatively little uncertainty about the contents of the annual report (Jordan, 1973). Hence, annual accounts announcements have limited impact on prices at the time of their publication (Ball & Brown, 1968). Even if quarterly statements are not audited, investors make decisions on their basis and do not wait for auditors' approval (Alves & Dos Santos, 2008; May, 1971). Possibly, the fact that quarterly statements are soon followed by audited annual accounts, which test their validity, dissuades managers from manipulating interim reports.

Results also suggest that French investors were unable to obtain performance information from other sources when interim reports were not available. This goes against Ball and Shivakumar's (2008) evidence from the American market, which shows that interim

announcements provide statistically significant, but relatively small new information input to the market. Other studies show that investors can obtain information from press publications, analysts' reports, or from private interactions with the management even before interim reports are published (Hutton, 2005; Ke & Petroni, 2004). Results of our study seem to indicate that these effects may be conditional upon availability of interim reporting.

The limitations of our research are typical for comparative international accounting studies. Ruland et al. (2007) discuss institutional and economic variables that can have an impact on results, including accounting practice, stock market regulation, legal systems and shareholder protection. We attempt to mitigate these concerns by focusing on two closely related countries, characterized by the continental accounting model, and which exhibit high correlation of economic variables. While there are institutional and cultural differences between Germany and France, they are unlikely to have an impact on our results, because they would need to have changed during our sample period to have an effect. While it is possible that such variables exist, their identification would be impractical for our research goals.

Results are robust to alternative estimation methods and alternative model formulations. On top of two procedures reported in this paper, we re-estimated the models as pooled ordinary least squares, random effects panel regression, two-way error component model (with time dummies) and found no material difference in results: the pattern persisted. Even when full earnings are used instead of residual earnings results presist. While this did result in different coefficient estimates, the pattern was still present. The sample structure (industry composition) does not seem to have an impact on results either. We tested if the fact that a large number of companies voluntarily adopted IFRS in Germany before 2005 influences regressions in the IFRS sub-sample. However, results for the 2005-2008 sub-sample produced similar results to the full IFRS sub-sample. We also attempted modifications to the variables in the model with the aim to satisfy the clean surplus assumption. These modifications had little effect on our results, in line with previous research (Isidro et al., 2006).

8. Conclusion

This paper shows that the availability of accounting information has an impact on performance of accounting based valuation models. We find that when interim reports are available, the model performs best in explaining market values towards the end of a fiscal year. On the contrary, if interim information is limited, the model is most useful in explaining market values in the month of annual accounts publication. These results indicate that accounting information is highly significant in market valuation of corporate stock and that investors are not able to substitute with other sources of information when accounting information is not available. Observed convergence after IFRS adoption can be interpreted as a concrete benefit of enhanced mandatory interim disclosures. The paper provides methodological insights for empirical accounting research. It shows that the date on which market values are observed matters in panel regressions. We also explore new econometric issues in modeling of accounting panel data.

Results presented in this paper raise a number of interesting questions and offer possible extensions. First of all, one wonders if other countries with limited interim disclosure exhibit the same patter as France before IFRS adoption, and whether a similar pattern shift occurred

afterwards. Secondly, it is puzzling why French investors were not able to substitute for lacking interim disclosures with information from other sources. One might expect, for instance, that where interim information is available only to insiders, insider trading would still cause market values to change in line with performance. Another question stems from analysis of estimation results: even after IFRS adoption the residual income model fits German data better than French data. What variables can explain this divergence? Finally, one can consider other consequences of accounting information availability. Does enhanced interim disclosure lead to higher trading frequency and volume? Does it limit the occurrence of price bubbles and thus increase market stability?

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Appendix 1. Estimation results for heteroskedasticity and autocorrelation corrected (HAC) standard errors

	Before fiscal-year-end						After fiscal-year-end					
	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
France: full sample												
RI	-1,15	-0,96	-0,65	-0,65	-0,60	-0,36	-0,35	0,07	0,26	-0,06	-0,04	0,16
t(RI)	-1,61	-1,57	-1,05	-1,15	-1,18	-0,89	-1,13	0,26	1,19	-0,15	-0,08	0,39
BV	0,78	0,74	0,75	0,79	0,87	0,94	0,99	1,01	1,07	0,99	0,96	0,93
t(BV)	3,78	3,48	3,82	3,64	4,52	5,03	4,89	6,09	6,47	5,63	5,30	5,49
N	4 156	4 132	4 165	4 171	4 169	3 624	3 705	3 698	3 696	3 678	3 676	3 682
R2_within	0,30	0,29	0,29	0,33	0,39	0,45	0,50	0,54	0,58	0,54	0,51	0,49
rho(u)	0,55	0,55	0,56	0,55	0,54	0,53	0,50	0,50	0,48	0,50	0,50	0,50
0,00												
RI	0,31	0,38	0,73	1,19	1,15	1,76	0,39	0,17	0,04	-0,12	-0,54	-0,59
t(RI)	0,62	0,74	1,84	3,08	3,52	2,49	1,31	0,38	0,05	-0,16	-0,58	-0,56
BV	0,37	0,36	0,34	0,32	0,30	0,24	0,40	0,35	0,29	0,32	0,36	0,31
t(BV)	1,99	2,08	2,22	2,18	1,86	1,54	2,38	2,13	1,99	2,13	2,30	2,10
N	1 346	1 345	1 342	1 350	1 346	1 276	1 309	1 303	1 299	1 297	1 294	1 295
R2_within	0,07	0,09	0,11	0,10	0,09	0,12	0,16	0,10	0,07	0,08	0,08	0,06
rho(u)	0,80	0,80	0,80	0,78	0,78	0,77	0,79	0,79	0,81	0,79	0,76	0,75

Table reports coefficient estimates and model fit statistics for average market values observed in the months around fiscal-year-end. Variable codes: RI stands for residual income. BV stands for book value of shareholders equity. rho(u) is the AR(1) coefficient of the residual. Intercept is omitted from the tabulation.

Appendix 1 (cont.)

	Before fiscal-year-end						After fiscal-year-end					
	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
Germany: full sample												
RI	1,77	1,65	1,77	1,66	1,47	1,41	1,27	1,47	1,54	1,44	1,42	1,68
t(RI)	2,62	2,67	3,34	3,24	3,25	3,34	4,34	5,88	6,26	4,97	4,78	5,54
BV	1,36	1,32	1,27	1,30	1,29	1,23	1,12	1,09	1,07	1,10	1,06	1,03
t(BV)	6,34	6,55	6,75	8,89	8,69	6,05	5,46	4,20	4,15	4,35	4,01	3,12
N	5 069	5 045	5 048	5 029	5 045	4 388	4 489	4 465	4 489	4 463	4 479	4 483
R2_within	0,50	0,55	0,56	0,56	0,50	0,40	0,31	0,23	0,20	0,26	0,29	0,26
rho(u)	0,51	0,52	0,53	0,51	0,56	0,58	0,66	0,65	0,65	0,67	0,69	0,67
0,00												
RI	1,68	1,83	1,93	3,08	3,07	3,02	2,39	2,51	2,88	2,85	2,98	2,77
t(RI)	2,49	2,74	2,79	3,27	3,03	2,95	3,52	4,41	6,04	5,32	5,07	4,78
BV	1,37	1,33	1,55	1,85	1,84	1,75	1,11	0,99	0,92	1,01	0,99	0,90
t(BV)	3,87	3,54	3,88	3,01	2,97	3,55	3,11	2,83	2,67	2,76	2,61	2,51
N	2 240	2 241	2 238	2 238	2 240	2 059	2 067	2 066	2 066	2 067	2 064	2 066
R2_within	0,44	0,44	0,49	0,46	0,46	0,51	0,38	0,36	0,37	0,35	0,34	0,29
rho(u)	0,14	0,19	-0,20	-0,65	-0,62	-0,51	0,51	0,61	0,64	0,60	0,62	0,68

Table reports coefficient estimates and model fit statistics for average market values observed in the months around fiscal-year-end. Variable codes: RI stands for residual income. BV stands for book value of shareholders equity. rho(u) is the AR(1) coefficient of the residual. Intercept is omitted from the tabulation.

Appendix 2. Comparison of within R2 by country and reporting standard (from Appendix 1)

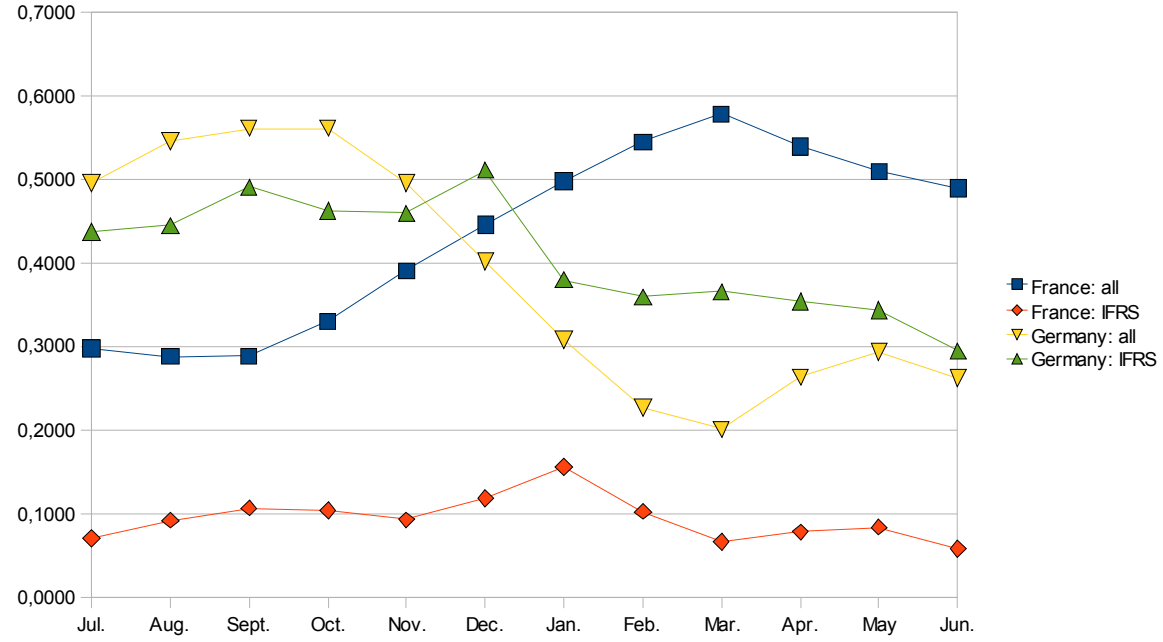

Figure shows correlations of the residual income model and market values observed in the last six months of a fiscal year (Jul.-Dec.), and first six months of the following fiscal year (Jan.-Jun.). Note: correlation is measured by within R^2 obtained from model with heteroskedasticity and autocorrelation corrected (HAC) standard errors, see Appendix 1 (within R^2 is measured as squared correlation of individually demeaned variables, that is within observations for each company; overall R^2 is higher, because it takes company-specific intercept into account).